

6. Readily administered in emergency surgery on account of its portability and where nitrous oxide oxygen apparatus is not available.
7. Vomiting occurs in only a small percentage of cases after anesthesia, and when it does occur, is not prolonged or distressing.
8. It is particularly adaptable to children.
9. May be used for induction to other anesthetics.
10. In simple overdose, resuscitation by the usual methods is quickly accomplished owing to the extreme volatility of the drug and its rapid elimination.

The danger signals of ethyl chloride anesthesia appear without warning on account of its quickness in effect and rapid transit into its different stages.

Contra-indications, as follows:

1. It is not suitable for prolonged administration on account of its dangers, expense, and great strain on the anesthetist.
2. It should not be used in alcoholists and neurotics, and is decidedly contra-indicated in mechanical and inflammatory respiratory obstruction; in cardio-vascular degenerations and all conditions giving rise to marked dyspnoea.

Although in 1880 the British Medical Association condemned the use of ethyl chloride as being too dangerous, its use now in England and Scotland is prevalent. In a report of anesthetics given in the Ear, Nose and Throat Department of the Royal Infirmary of Edinburgh, Scotland, for the year 1920, there were over 1200 ethyl chloride anesthetics. This represents double the number of any other anesthetic given in this department. Enthusiastic advocates of this anesthetic are M. W. Ware of New York, A. H. Miller of Rhode Island, Erdman of Brooklyn. Murray, in 1905, reported 150 administrations in infants one year of age; the youngest patients were five to fourteen days old; the larger proportion were from five to seven weeks old. A. H. Miller of Providence, Rhode Island, in 1912, compiled the experiences of twelve anesthetists; in this series there occurred one death in every 13,365 administrations. M. W. Ware of New York, in 1917, reported one death in every 15,000 ethyl chloride anesthetics. In January, 1922, Webster of Winnipeg, Canada, reported 22,000 administrations without a fatality, although the greater number of these were inductions to ether. However, he considers nitrous oxide safer. He uses the closed method, using the Ormsby inhaler and prefers it to the open method. Guedel of Indianapolis uses the Yankauer mask, and places ethyl chloride third in value to nitrous oxide and oxygen and ether, and above chloroform. He reports two thousand cases without a death, fifteen of which were for prolonged anesthesia of fifty-three minutes duration.

(I am greatly indebted to Dr. May Walker of Oakland for her guidance and instructions in my first administrations of ethyl chloride as a general anesthetic in minor surgery.)

INDICATIONS FOR THE ADMINISTRATION OF QUINIDIN IN AURICULAR FIBRILLATION *

By ALBION WALTER HEWLETT, M. D., San Francisco (From the Department of Medicine, Stanford University.)

In 1918, W. Frey announced that a certain proportion of patients suffering from auricular fibrillation regained a regular heart rhythm after having been treated with quinidin sulphate. This announcement was followed by confirmatory reports from many sources. A review of these reports indicates that certain facts concerning the action of quinidin now seem established. In some patients with auricular fibrillation the drug is clearly indicated, in others its use is not so promising, and in still others it occasionally does positive harm.

The main facts upon which the indications for quinidin rest are as follows:

1. A normal rhythm has been restored in over 50 per cent of the reported cases of auricular fibrillation that have been treated with quinidin.

2. The results obtained have been markedly influenced by the duration of the fibrillation. Where the irregularity had been of very recent onset, the drug usually succeeded; where the irregularity had lasted more than a year, successes were much less common. Of nineteen chronic cases reported by Frey, five became regular. My own experience has been much less favorable; for I have had only two successes where the abnormal rhythm had presumably lasted continuously for a year or more (see Chart 1).

3. Other factors, which apparently influenced the results of quinidin treatment, were cardiac decompensation, cardiac dilatation, and the dose of the drug employed. Cardiac decompensation and cardiac dilatation are said to lessen the chances for recovery of the normal rhythm. Where the normal rhythm has been restored, this has usually occurred with moderate doses of the drug given for two to four days; but in some patients the normal rhythm has become established only after large doses have been given or the treatment has been continued for a week or more. Thus, the percentage of restorations has been somewhat higher when large doses have been given to stubborn cases for a week or more. Neither the patient's age, nor his blood pressure, nor the presence or absence of chronic endocarditis has appeared to influence the results obtained.

4. In the vast majority of patients whose normal rhythms have been restored, the fibrillation has recurred; frequently within a few days, in other cases only after months. Except in paroxysmal types of fibrillation, the persistence of a normal rhythm for nine months or over has been exceptional. Recurrences have frequently been controlled by repeating the treatment; but in some cases the drug, though at first successful, has failed on the second or third recurrence. An important question, not yet decided, is whether such patients should receive the drug continuously with the hope of averting fresh attacks of fibrillation.

5. In most patients, the drug has produced no

* Read before the Section on Medicine of the Medical Society of California, at Yosemite, May 15, 1922.

serious effects. Palpitation and an increased ventricular rate need cause no apprehension, provided the patient's general condition remains satisfactory. Occasionally, compensation has been distinctly impaired by the drug, or syncope has occurred. In a very few cases, death has occurred while quinidin was being given or shortly after it had been discontinued. We are not certain that the drug was responsible for these deaths. It has been suggested that auricular clots may have become loosened by the return of auricular contractions, thus causing emboli. Possibly, also, an impaired compensation or some change in the ventricular rhythm may have contributed to a fatal issue.

6. More or less clinical improvement has usually followed the restoration of a normal

Beyond doubt, the patients most suitable for treatment with quinidin are those in whom the fibrillation has developed recently and whose hearts have previously been in good compensation. When fibrillation occurs, such patients commonly complain of palpitation, precordial oppression and breathlessness on exertion. If a normal rhythm is not restored after a few days' treatment with rest and sedatives, such patients should always, in my judgment, receive the quinidin treatment. Small doses of the drug usually restore the normal rhythm, and the danger from emboli and other accidents appears to me to be negligible. When the regular rhythm has been re-established, the symptoms usually disappear completely. Finally, in these patients, the heart may remain regular

CHART I.
Sinus Rhythm Restored by Quinidin

NAME AND NUMBER	AGE	CARDIAC DIAGNOSIS	B. P.	DECOM-PENSATION	ENLARGEMENT OF HEART	DURATION	AMOUNT*	FIBRILLATION RECURRENT	REMARKS
G. F. 84234	67	Arteriosclerosis Myocarditis	218	Marked	Marked	1 year plus	18-105	None in 5 months	
A. B. 91015	35	Chronic endocarditis Lues iii	105	Marked	Marked	Few months	24- 37	None in 3 months	
A. P. R. 96877	33	Chronic endocarditis	122	Very little	None	2½ days	3- 3	Not known	
A. J. 92992	70	Coronary sclerosis Myocarditis	124	Considerable	Considerable	6 months	18- 34	2 days	Died 2 days later
Sch. 81564	38	Chronic endocarditis	114	Marked	Marked	6 months	18- 27	None in 9 months	Digitalis has previously failed
Simp. 92990	78	Myocarditis Coronary sclerosis	150	Marked	Marked	2 weeks	30-100	3 days	Died 3 weeks later
Buc. 104280	58	Myocarditis	130	Moderate	None	2 months	18- 30	12 days	Recurrence was immediately relieved by 8 grains of quinidin
Fol. T. 99479	53	Myocarditis Aortitis	130	Little	Moderate	2 days	3- 6	None in 6 months	Flutter then regular
Cas. 100188		Myocarditis	110	Moderate	Moderate	2 months	18-123	10 days	
Ma. 48	48	Myocarditis	180	Little or none	Marked	Few weeks or months	36-160	2 days	
H. G. 45	45	Myocarditis	120	None	None	3 days	12- 18	None in 4 months	
Cl. 104224	50	Myocarditis	110			1 day	9- 9		
Gra. 70678	55	Myocarditis	90	Considerable	Marked	4 days	12- 18	7 days	Recurred in 1 week and then resistant to quinidin
Allum. W. 104397	73	Myocarditis		Moderate	Moderate	Paroxysmal	9	10 days	Has twice become regular since then under quinidin
Ball. 41	41	Myocarditis	140		Somewhat	About 1 year	18- 21	None in 3 weeks	

*Under amounts, the first figure represents the maximum daily dose and the second figure the total amount received.

rhythm. The subjective discomfort caused by the arrhythmia has usually been lessened. In many cases compensation has been improved; and occasionally it has been practically restored, even where the usual treatment with digitalis had failed.

Bearing the foregoing considerations in mind, we may attempt to formulate the indications for administering quinidin to patients with auricular fibrillation. In every case the possible dangers must be weighed against the probable chances for restoring a regular rhythm, for maintaining this rhythm and for improving the degree of compensation. Furthermore, the treatment itself must be so conducted as to avoid, so far as possible, dangers and accidents.

for an indefinite time. After the heart has become regular, such patients should be carefully investigated, in order that focal infections or other causes of cardiac irritation may be determined and removed. It appears to me important that general practitioners should recognize the onset of fibrillation in these patients in order that prompt treatment with quinidin may be given. A failure to do so permits the fibrillation to become more firmly established, so that it is more resistant to treatment. Furthermore, the irregularity itself places a strain on the heart muscle, and in time favors dilatation, hypertrophy, and decompensation.


Where the fibrillation has recently developed in patients with advanced decompensation, quinidin

has restored the normal rhythm in a considerable proportion of cases. Yet, in my experience, these patients are much less favorable subjects for the treatment than are those in whom compensation had previously been good. Often the restoration of a regular rhythm has caused but little change in the patient's general condition and early relapses have been frequent. In these patients, also, the possible dangers from dislodging auricular thrombi, from decompensation and from changes in the ventricular rhythm must be taken into consideration. Despite these objections, I believe that the drug should be given to such patients, unless decompensation is extreme. If a normal rhythm is restored and the auricular fibrillation later recurs, further action must be guided by the effect which

one may say in a general way that patients with marked decompensation, greatly enlarged hearts, or evidence of coronary diseases are relatively unfavorable subjects. In chronic fibrillation, then, quinidin has been, on the whole, rather disappointing as a therapeutic measure; yet the occasional brilliant success raises the hope that better results will be obtained when more is known of the drug and of the type of chronic case most suitable for treatment.

In giving quinidin, certain general precautions should be observed. The patient should be kept in bed, preferably under the supervision of a nurse. If there has been cardiac decompensation, this should be improved by a preliminary rest. Some authors recommend that digitalis be not given with the quinidin. One should begin the

CHART II.
Quinidin Produced no Change in Rhythm.

NAME AND NUMBER	SEX	AGE	CARDIAC DIAGNOSIS	B. P.	DECOMPENSATION	ENLARGEMENT OF HEART	DURATION	AMOUNT
P. C. W. 93891	M	62	Myocarditis Angina pectoris	170	Marked	Marked	1 year plus 	30-
C. H. 97100	F	52	Myocarditis Chronic endocarditis	165	Considerable	Moderate	2 years	18-100
Ste. 83985	F	64	Arteriosclerosis Myocarditis	160	Marked	Marked	1½ years	30-160
Glei. 86117	F	37	Chronic endocarditis Myocarditis	120	Considerable	Considerable	1 year	24-
L. K. 58443	F	61	Arteriosclerosis Myocarditis	200	Moderate	Slight	6 weeks	36-147
J. M.	M	50	Myocarditis		Moderate		2 years plus	24-
Sch. 99199	M	63	Arteriosclerosis Myocarditis	190	Marked	Marked	2 years	66-300
Dol. 100196	M	62	Myocarditis		Considerable	Marked	½ year	24-200
Sha. 93608	M	70	Myocarditis	118	None	Slight	20 years	18-180
Rus. 100711	M	54	Myocarditis				8 months	24-142
Og. 98431	M	53	Chronic endocarditis Myocarditis	90	Marked	Marked	18 months	18-117
Ta. 98801	F	49	Chronic endocarditis	124	Marked	Marked	For years	24-114
Car.	M	44	Myocarditis	100	Little	Little	2½ months	18- 75
Bal.	F	40	Chronic endocarditis	140	Moderate	Very marked	Over a year	30-150
Emp. 91644	M	71	Arteriosclerosis Myocarditis	140	None	None		18- 72
Aber. 104365	F	56	Myocarditis	260	Moderate	Marked	6 months	18- 63

the change of rhythm had upon the patient's general condition.

The longer fibrillation has lasted, the poorer, on the average, are the chances for recovering a normal rhythm when quinidin is given. Nevertheless, some patients recover the normal rhythm, even though fibrillation has persisted for months or years, and occasionally a brilliant clinical result has been obtained where other treatment has practically failed. In general, however, the large number of failures in these chronic cases and the marked tendency to early recurrence among the successes, causes one to hesitate about using a drug that appears to be not entirely free of danger. At present, unfortunately, we have no certain method for selecting patients in this group who are most apt to be benefited by the drug; although

quinidin sulphate administration with a small dose of three grains on the first day, and then rapidly increase to a maximum of from eighteen to thirty grains daily. If no unfavorable symptoms supervene, the latter should be continued for about a week. Should the rhythm become regular, the drug is best stopped altogether. If the irregularity recurs, and if the clinical improvement during the period of regular heart action has warranted further trial, then the drug should be given again, and if the pulse again becomes regular, the quinidin may be continued in small doses with the hope that it may prevent further relapses.

Unfortunately, we have no certain means of predicting what patients may do badly while taking the drug, and alarming symptoms have occurred, without warning, even after small doses.

For this reason it is necessary to proceed carefully in every case.

CONCLUSIONS

1. When auricular fibrillation occurs in a heart that has previously been in good compensation, quinidin should always be given; provided several days' treatment with rest and sedatives has failed to restore a normal rhythm.

2. When auricular fibrillation occurs in a heart already decompensated, quinidin should be given a trial, provided the decompensation is not very serious. The results in this group of patients are not very satisfactory; not so much because the drug fails to restore the regular rhythm, but because relapses are common and the general condition may not be altered materially by the change in rhythm.

3. When fibrillation has persisted for over a year, the results of quinidin treatment are not particularly encouraging. The proportion of patients who recover a normal rhythm is not great, and many of these relapse after a short time. Furthermore, the dangers from the drug are probably greater in these patients.

4. Nevertheless, occasional patients with long standing auricular fibrillation have shown a remarkable improvement after receiving quinidin, even when other forms of treatment have been relatively ineffective. At present we are not able to predict what cases will thus be favorably affected.

Clinics or Dispensaries and Free Medicine—The report of the Council on Medical Education and Hospitals of the A. M. A. (Journal A. M. A., August 5) on clinics and dispensaries furnishes some important data and indicates some rather startling tendencies in medicine. It is apparently conservatively estimated that some eight million persons or about 7 per cent of the entire population of the United States made over twenty-nine million visits to dispensaries during last year. Some of the main facts brought out by the Council in this difficult survey are:

1. There is a steady increase in the number of patients seeking treatment in general dispensaries.

2. There has been an unprecedented increase since the war in the number of special clinics and dispensaries, such as those for tuberculosis, venereal disease, mental hygiene and child hygiene.

3. There is great need for individualized study and treatment of dispensary patients, to counteract what seems to be a prevailing tendency to routinization.

4. There is need of a closer bond between the out-patient service and the other service of hospitals, and this will best be met by having the hospital and the out-patient staffs identical and by keeping unified records.

5. In the matter of finances there is an increasing tendency to charge nominal fees, thereby placing part of the cost of an institution on the patient.

6. A general increase is noted in the use of social service workers to see that patients continue their treatment, and to investigate their social and financial status so as to prevent pauperizing.

7. The difficulty of securing satisfactory data is increased by the inadequacy of clinical and office record systems in a large number of institutions.

8. There is a great and increasing amount of educational work, especially the teachings of interns, medical students, graduates, and pupil nurses.

UNDERLYING PRINCIPLES OF PLASTIC SURGERY*

By JOSEPH A. PETTIT, M. D., Portland, Oregon

The underlying principles of plastic surgery vary with the region of the body in which the procedure is being carried out, and also in reference to the tissues that are being handled. There are certain general principles, however, which apply in varying degrees to all plastic surgical procedures. Certain basic principles are more or less essential to a successful technique in the reconstruction work of any part of the body. In dealing with these principles they may be classified under certain general headings.

1. *Blood Supply*: In the reconstruction of parts, and in securing flaps to fill in defects, great care should be exercised to conserve the blood supply of the transposed tissues. In the selection of the flaps of tissue to be utilized in plastic work two thoughts should be foremost in mind. First, to secure a flap of tissue which is adequate not only to fill in the defect, but to provide for loss of size by a certain amount of contraction; and, second, the flap of tissue selected must have a base that carries blood supply to all parts of the flap adequate for the preservation of its existence. If the base of the flap can be left in that direction from which the nutrient blood vessels naturally come, the security of its integrity is greatly enhanced. That is to say, providing the pedicle of the flap can be so placed as to carry the largest blood vessel which goes to the particular tissue to be transposed, greater assurance is provided for a maximum nutrition than if the pedicle is located where some of the smaller nutrient vessels enter. The base of the flap should be as broad, if not broader, than the greatest width of the flap. If the pedicle can be so located as to carry a large nutrient vessel, the base of the flap can, with safety, be made of less breadth than the transposed flap. Undue torsion of the base of the flap is apt to produce a partial constriction of the lumen of the nourishing vessels and thereby endanger the life of the flap. Undue tension on the pedicle may produce a similar unfortunate result.

2. *Coaptation*: In the placing of plastic flaps, minute attention to the details of accurate coaptation is of considerable importance. The recognized principle of the accurate apposition of the fractured ends of bones to secure solid union applies to plastic flaps as well. In order to secure a good, an expeditious, and a lasting union of any type of soft tissue, it is important that similar tissues contact, and at the same time contact with precision. Fascia should be sewed to fascia, periosteum to periosteum, mucous membrane to mucous membrane, and skin to skin. The mesoblastic tissues can be overlapped and will adhere firmly in a double layer. In dealing with the epiblastic tissues it is necessary to avoid overlapping and to accurately coaptate the cut edges. The fibrous tissue cells will unite together irre-

* Read before the Section on Surgery of the Medical Society of California at Yosemite National Park, May 15, 1922.